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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/300,363	04/26/1999	PHILIP J. IRELAND	11675.99.1	4379

22901 7590 01/15/2003

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EXAMINER

WARREN, MATTHEW E

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 01/15/2003

18

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/300,363

Applicant(s)

IRELAND ET AL.

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the RCE and Amendment filed on October 17, 2002.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 8-10, and 12-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,165,839) in view of Jeng et al. (US 5,792,687).

Lee et al. shows (fig. 15) a contact structure comprising a lower bulk insulator layer (9) situated above a substrate (1), a dielectric layer (10) above the bulk insulator, a conductor layer (20a) above the dielectric layer, and a sleeve insulator layer (26) of SiN which extends through and is in contact with the bulk insulator and the conductor layer. The sleeve insulator layer is also in contact with the dielectric layer and extends within the lower bulk insulator to terminate at a first terminus above the substrate. A second terminus, opposite the first terminus is located at a top surface of the lower bulk insulator. An electrically insulating layer (21) is formed conformably upon the conductor layer and has a sidewall in contact with the sleeve insulator. A conductor structure (24) is insulated from the conductor layer by the sleeve insulator. The conductor structure extends from the sleeve insulator to make contact with a material (22) that does not conduct electricity. Lee shows all of the elements of the claims except the second

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terminus located between the upper and lower surfaces of bulk insulator. Jeng shows (figs. 5-10) a semiconductor device having a lower bulk insulator (22) formed above a substrate (2). A sleeve insulator (30) is in contact with conductor layer (24) situated above the bulk insulator layer. The sleeve insulator has a first terminus (top of spacer 30) and second terminus (bottom of spacer 30) opposite the first terminus and located between the upper and lower surface of the bulk insulator. With this configuration the sleeve insulator allows for a wider overlay process and avoids short circuits. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the contact structure of Lee by forming a sleeve insulator having a second terminus between an upper and lower surface of the bulk insulator as taught by Jeng to avoid short circuits in the upper contact structure area.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,165,839) and Jeng et al. (US 5,792,687) as applied to claim 1 above, and further in view of Ohsaki (US 6,198,143 B1).

Lee and Jeng show all of the elements of the claims except the refractory metal silicide on the active area. Ohsaki shows (fig 1) a contact structure for a semiconductor device in which a conductive plug (11) is in contact with a refractory metal silicide (6). The silicide is formed on active region (5) of the device to reduce the contact resistance (col. 1, lines 19-63). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the contact structure of Lee and Jeng

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with a refractory metal silicide because Ohsaki teaches that refractory metal silicides are desirable materials for lowering the contact resistance of a device.

Claims 22-25, are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,165,839) in view of Jeng et al. (US 5,792,687) and Ohsaki (US 6,198,143 B1).

Lee et al. shows (fig. 15) a contact structure comprising a lower bulk insulator layer (9) situated above a substrate (1), a dielectric layer (10) above the bulk insulator, a conductor layer (20a) above the dielectric layer, and a sleeve insulator layer (26) of SiN which extends through and is in contact with the bulk insulator and the conductor layer. The sleeve insulator layer is also in contact with the dielectric layer and extends within the lower bulk insulator to terminate at a first terminus above the substrate. A second terminus, opposite the first terminus is located at a top surface of the lower bulk insulator. An electrically insulating layer (21) is formed conformably upon the conductor layer and has a sidewall in contact with the sleeve insulator. A conductor structure (24) is insulated from the conductor layer by the sleeve insulator. The conductor structure extends from the sleeve insulator to make contact with a material (22) that does not conduct electricity. Lee shows all of the elements of the claims except the second terminus located between the upper and lower surfaces of bulk insulator. Jeng shows (figs. 5-10) a semiconductor device having a lower bulk insulator (22) formed above a substrate (2). A sleeve insulator (30) is in contact with conductor layer (24) situated above the bulk insulator layer. The sleeve insulator has a first terminus (top of spacer

30) and second terminus (bottom of spacer 30) opposite the first terminus and located between the upper and lower surface of the bulk insulator. With this configuration the sleeve insulator allows for a wider overlay process and avoids short circuits. Lee and Jeng show all of the elements in the claims except the refractory metal silicide contact on the substrate. Ohsaki shows (fig 1) a contact structure for a semiconductor device in which a conductive plug (11) is in contact with a refractory metal silicide (6). The silicide is formed on active region (5) of the device to reduce the contact resistance (col. 1, lines 19-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the contact structure of Lee by forming a sleeve insulator having a second terminus between an upper and lower surface of the bulk insulator as taught by Jeng to avoid short circuits in the upper contact structure area. It would have also been obvious to modify the contact structure of Lee with a refractory metal silicide because Ohsaki teaches that refractory metal silicides are desirable materials for lowering the contact resistance of a device.

Response to Arguments

Applicant's arguments with respect to claims 1-6 and 8-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (703)

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305-0760. The examiner can normally be reached on Mon-Thurs, and alternating Fri, 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

MEW

MEW
January 12, 2003



[Handwritten signature]
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